



ENTERGY

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November 27, 1996

2CAN119603

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Licensee Event Report 50-368/96-004-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(ii)(B), enclosed is the subject report concerning the Plant Protective System design.

Very truly yours,

Dwight C. Mims
Director, Nuclear Safety

DCM/tfs

enclosure

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cc: Mr. Leonard J. Callan
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
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Arlington, TX 76011-8064

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700 Galleria Parkway
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Arkansas Nuclear One - Unit 2

DOCKET NUMBER (2)

05000368

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TITLE (4) Unavailability Of Some Functions Of The Plant Protective System For Loss Of Power Conditions With A Channel Bypassed Caused The Potential For Operation Outside The Design Basis Of The Plant

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	30	96	96	004	00	11	27	96	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)							
POWER LEVEL (10)	98	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)				
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)				
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER				
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Specify in				
		20.405(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	Abstract Below				
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	and in Text						

LICENSEE CONTACT FOR THIS LER (12)

NAME

Thomas F. Scott, Nuclear Safety and Licensing Specialist

TELEPHONE NUMBER (Include Area Code)

501-858-4623

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X (If yes, complete EXPECTED SUBMISSION DATE)			12	20	96

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

During reviews associated with preparation of a plant modification, Design Engineering personnel discovered a condition that potentially could have placed the plant outside its design basis. The scenarios identified would result in a failure of Containment Isolation Actuation Signal, Containment Spray Actuation Signal, and Emergency Feedwater Actuation Signal to automatically actuate if a loss of offsite power with concurrent failure of a DC bus occurred with a Plant Protective System (PPS) channel in bypass. Prior to a Technical Specification (TS) amendment that was issued in April of 1995, bypass of a PPS channel was limited to 48 hours. Amendment 159 to the ANO-2 TS allowed a PPS channel to remain in bypass until the next cold shutdown based upon an assumption that no safety function would be prevented by a single failure with a channel bypassed. The root cause of this condition remains under investigation and will be provided as a supplement to this report. Administrative controls have been established to prevent a channel from being bypassed for greater than 48 hours until the condition has been resolved. A review of operating records indicated that no PPS channel has actually been bypassed for more than 48 hours since the TS amendment became effective.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

A. Plant Status

At the time this condition was discovered, Arkansas Nuclear One Unit 2 (ANO-2) was operating in normal steady-state conditions at 98 percent power.

B. Event Description

On October 30, 1996, during reviews associated with preparation of a plant modification, Design Engineering personnel discovered a condition that potentially could have placed the plant outside its design basis because some automatic functions of the Plant Protective System (PPS) [JC] would not have been available during loss of power scenarios with a PPS channel in bypass.

At ANO-2, the PPS consists of the Engineered Safety Features Actuation System (ESFAS) [JE] and the Reactor Protective System (RPS) [JC]. The ESFAS monitors Reactor Coolant System (RCS) [AB] pressure, Steam Generator (SG) [AB] pressures and levels, Containment [NH] pressure, and Refueling Water Tank (RWT) [BP] level and initiates a protection response whenever the appropriate monitored parameters deviate from pre-selected actuation setpoints. ESFAS functions include the Containment Isolation Actuation Signal (CIAS) [JM], Containment Spray Actuation Signal (CSAS) [BE], Safety Injection Actuation Signal (SIAS) [BQ], Recirculation Actuation Signal (RAS) [BP], Emergency Feedwater Actuation Signal (EFAS) [BA], Containment Cooling Actuation Signal (CCAS) [BK], and Main Steam Isolation Signal (MSIS) [SB]. The ESFAS Auxiliary Relay Cabinets (ARCs) receive coincident two-out-of-four initiation relay contact signals from the PPS to each ESFAS system and automatically actuate a protective action after satisfying selective two-out-of-four logic in the associated ESFAS actuation circuit.

The ANO-2 vital power design for the PPS consists of one Emergency Diesel Generator (EDG) [EK], one battery, and two inverters for each power division. The PPS is designed such that no single channel failure results in loss of its protective functions. RAS and EFAS are specifically designed not to actuate upon loss of a power division. Power supplies for the RWT level instrument loops for RAS and the Steam Generator level instrumentation loop are auctioneered so that only one instrument loop fails with a power division loss. The remaining ESFAS input instrumentation loops (SG pressure, Pressurizer pressure, Containment pressure, etc.) are not equipped with auctioneered power supplies. The PPS also has internal auctioneered power supplies. Upon a power division failure concurrent with a Loss-Of-Offsite-Power (LOOP), some of the measurement channels do not fail to their safe state. The result of this configuration is that, with a loss of a power division concurrent with a LOOP and a PPS channel bypassed on the operable division, CIAS, CSAS, and EFAS will fail to actuate. The SIAS and CCAS functions will fail to actuate upon Containment pressure signals, but the functions are satisfied by the RCS

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pressure signal input failing low. If a channel is not in bypass, all PPS functions will be available if a power division is lost concurrent with a LOOP except automatic feed water level control to prevent SG over-fill.

ANO-2 Technical Specifications (TS) allowed one PPS channel to be in bypass for up to 48 hours to perform maintenance or testing based upon the low probability of a fault such as loss of a power division affecting more than one channel during that time interval. Amendment 159 to ANO-2 TS was issued by the NRC on April 3, 1995, in response to the ANO submittal dated July 22, 1993. This amendment increased the time allowed during plant operation at full power with one PPS channel bypassed from 48 hours to "until the next cold shutdown." Reviews to support this amendment concluded that the bypass of a specific protective channel combined with a single failure would not prevent required protective actions. The discovery of the potential unavailability of required protective functions under conditions described above indicated that the basis for Amendment 159 allowing greater than 48 hours with a PPS channel in bypass was in error. The result of this condition is that the plant could have been operated outside its original design basis since all required automatic safety functions would not have been available with a PPS channel bypassed.

C. Root Cause

The determination of the root cause for this condition is not complete. A supplement to this report will be submitted to document the results of an evaluation that is in progress. It is expected that this supplement will be submitted by December 20, 1996.

D. Corrective Actions

An evaluation of this condition concluded that PPS will continue to perform its design function if a channel is bypassed for no longer than 48 hours. Administrative controls were promptly established to prevent a PPS channel remaining in bypass for greater than 48 hours until the condition is resolved.

A "Night Order" was provided to ANO-2 Operations personnel to remind them of guidance contained in Emergency Operating Procedures regarding actions to mitigate potential SG over-fill events.

Additional corrective actions will be determined following completion of the root cause evaluation.

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E. Safety Significance

A review of records confirmed that ANO-2 had not operated with a PPS channel bypassed for greater than 48 hours since TS Amendment 159 became effective. The plant never operated outside the original design and licensing basis that had been previously evaluated to provide an acceptable level of safety. The scenario identified that would result in failure of CIAS, CSAS, and EFAS to perform their functions requires a LOOP while a PPS channel is bypassed with the concurrent failure of a DC bus feeding two of the three channels not in bypass, a situation with a low probability of occurrence. With the same power failure scenario, LOOP concurrent with the loss of a power division, if no PPS channel is bypassed the feed water level control to prevent SG over-fill would require manual intervention. The SG fill rate (estimated to be in excess of 60 minutes to over-fill the SGs), availability of level instrumentation, existing procedural guidance, training provided to the Operations personnel, and reminders transmitted by recent "Night Orders" provide confidence that this function would be accomplished. All other PPS functions will be available under postulated design basis events and associated single failures. This condition is therefore judged to have had minimal actual safety significance.

F. Basis for Reportability

The potential for ANO-2 having operated for extended periods with a PPS channel in bypass could have resulted in some automatic PPS functions being unavailable during loss of electrical power conditions. This caused the plant to have been outside its design basis and is being reported in accordance with 10CFR50.73(a)(2)(ii)(B). A report was made to the NRC Operations Center at 1518 on October 31, 1996, in accordance with 10CFR50.72(b)(1)(ii)(B).

G. Additional Information

There have been no similar conditions reported by ANO as Licensee Event Reports.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].